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10/540,207

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EXAMINER

THAI, SUSAN

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/540,207 | Applicant(s) SUOMINEN, HANNU L. | |
| | Examiner SUSAN THAI | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Status

1. The amendment filed 6/16/10 adding claim 21 is acknowledged. Currently claims 1-21 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 6 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The limitation "...controlling the cell current by automation" (claim 1, lines 11-12 and claim 6, lines 14-16) was not described in the specification such that one skilled would know how the cell's current was controlled automatically.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1 and 6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 6, the limitation "...controlling the cell current by automation" (claim 1, lines 11-12 and claim 6, lines 14-16) renders the claim indefinite because it is unclear what the applicant meant by automation. Automation encompasses both mechanical and electronic devices.

Claim Rejections - 35 USC § 103

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 3-8 and 10-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbst et al. (Us 4872959) in view of Haivala (US 5022974).

Regarding **claims 1 and 6**, Herbst discloses treatment of waste water using electrochemical flocculation (C1/L10-23) where water to be cleaned is passed through an electrolytic cell provided with two metal electrodes of different negativities (17 and 23) (see Fig. 1, different negativities are inherent in order for separation to occur); performing electrolysis between the two electrodes such that the more electronegative electrode is non-wearing in a cleaning process and is used for producing hydrogen gas and hydroxyl ions from water (C10/L57-66 and C11/L13-18); the less electronegative electrode is an active wearing electrode used for producing metal ions in a solution to be cleaned (C10/L12-13, the anode produces metals if metals are not added separately); controlling the cell current by automation to produce a strictly controlled electric field (C7/L20-33 where the different voltages are applied across the rod which is controlled by the voltage source and inline resistor); effecting in the cell the strictly controlled electric field a desired oxidation (abstract, a desired oxidation is inherent in

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order to remove the suspended particles); reduction reaction for removing one or more designated impurities from water to be cleaned (abstract and see examples I-III); feeding the mass flow from the cell to a separation tower of a flock and purified water (see Fig. 1 and C7/L34-50) and allowing the hydrogen gas to raise the flock in the separation tower (c8/L26-33); using coaxial pipes as electrodes, the inner electrode pipe being the more electronegative electrode, having holes (see Fig. 1, C9/L6-9 and abstract). Herbst further discloses that the system can be periodically reversed so as to aid in the cleaning of the cathode portion (C7/L46-50).

Herbst, however, does not explicitly disclose feeding flush water by pressure.

Haivala discloses an apparatus for the electrolytic treatment of liquids (abstract). Haivala further discloses using pressure to produce jet streams into the electrodes (C3/L68-C4/L9 and C6/L23-36).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the streams of Herbst by using the pressure sprays of Haivala because the operative area of the electrode surfaces can be effectively used (C2/L5-13).

Regarding **claim 3**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses where the waste water is from sewage treatment facilities, streams or the like (C1/L15-23).

Regarding **claim 4**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses where the waste water to be cleaned could be double treated (C11/L36-42). Although Herbst, does not explicitly disclose two

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electrolytic cells, it would have been obvious to one of ordinary skill in the art to have two electrolytic cells for double treating the water. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960) (see MPEP § 2144.04).

Regarding **claims 5, 7 and 12-14**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses the outermost electrode being made of iron or aluminum (see examples I-II) and are readily replaceable (abstract).

Regarding **claim 8**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses that the outer electrode pipe (23) terminates prior to a waste water inlet (11) (see Fig. 1).

Although Herbst further discloses that the inner pipe (17) continues to the water inlet (11), Herbst does not explicitly disclose the inner pipe continuing past the water inlet by way of a valve to a wash water pump.

Haivala further discloses the water pump (14) connected to the anode through valve (15) (see Fig. 5 and C6/L28-36).

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the inner pipe of Herbst by extending the pipe past the water inlet by way of a valve to a wash water pump of Haivala because the flow can be controlled (C4/L56-58).

Regarding **claims 10 and 15-16**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses the use of stainless steel as the inner electrode and iron as the outer electrode (see examples I-III and C9/L27-31 where different metals are used for the electrodes) and an insulating housing tube (C6/L67-68).

Regarding **claims 11 and 17-20**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses that inner and outer electrode pipes are locked concentrically to each other by means of end caps (30) that link to threads (25, 26) which surround the ends of the inner electrode pipe and inside which are retained the ends of the outer electrode pipe (see Fig. 1, where the threads are considered the unscrewable portion of the endcap).

Regarding **claim 21**, modified Herbst discloses all the limitations as set forth above and Herbst further discloses the removal of salts (abstract) and that it is well known that treatments of water includes streams, or the like (C1/L15-24, where streams includes rivers and rivers are natural watercourses that flow towards the sea thus the stream is considered sea water).

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herbst et al. (US 4872959) in view of Haivala (US 5022974) as applied to claim 1 above, as evidenced by Till et al. ("Fe(0)-supported Autotrophic Denitrification").

Regarding **claim 2**, modified Herbst discloses all the limitations as set forth above.

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Herbst, however, does not explicitly disclose the removal of nitrogen, using hydrogen ions for producing ammonium ions which escape upon coprecipitating with iron hydroxide precipitate, the precipitate rising along with the hydrogen gas in the form of flock to the surface of clean water, iron is oxidized and ammonium or nitrate nitrogen is reduced as: $6\text{Fe} + 2\text{H}^+ + 2\text{NO}_3 \leftrightarrow 6\text{FeO}\downarrow + \text{N}_2\uparrow + \text{H}_2\uparrow$ whereby the result is denitrification as nitrogen escapes in the form of nitrogen gas.

Although Herbst does not explicitly disclose denitrification, the use of a known technique to improve similar devices (methods or products) in the same way is likely to be obvious. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, C.). Applying a known technique to a known device (method or product) ready for improvement to yield predictable results is likely to be obvious. See *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1395 – 97 (2007) (see MPEP § 2143, D.). Denitrification using cathodic hydrogen and iron is well known as evidenced by Till (abstract, see equations 1-4).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Herbst et al. (Us 4872959) in view of Haivala (US 5022974) as applied to claim 8 above, as further evidenced by Suominem (US 5888359).

Regarding **claim 9**, modified Herbst discloses all the limitations as set forth above and Haivala further discloses that the flow of the inlet is controlled by the valve (C4/L56-58) and Herbst further discloses an outlet (see Fig. 1) adapted to be opened for discharging precipitate and wash water from the electrolysis space.

Although Herbst, does not explicitly disclose that the outlet duct has a valve connected, it would have been obvious to one of ordinary skill in the art at the time of the invention to add a valve like that of the inlet to the outlet duct (as evidenced by Suominem, see Fig. 1) because it controls the flow of the solution. The mere duplication of parts, without any new or unexpected results, is within the ambit of one of ordinary skill in the art. See *In re Harza*, 124 USPQ 378 (CCPA 1960) (see MPEP § 2144.04).

10. Claims 11 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herbst et al. (Us 4872959) in view of Haivala (US 5022974) as applied to claim 8 above, as further evidenced by King (US 3972800).

Regarding **claims 11 and 17-20**, assuming that the applicant meant a separate unscrewable portion containing the threads, modified Herbst discloses all the limitations as set forth above and Herbst further discloses that inner and outer electrode pipes are locked concentrically to each other by means of end caps (30) that link to threads (25, 26) which surround the ends of the inner electrode pipe and inside which are retained the ends of the outer electrode pipe (see Fig. 1).

Herbst, however, does not explicitly disclose a separate unscrewable portion containing the threads.

It is well known in the art that the end cap can be placed directly or indirectly onto the electrodes (as evidenced by Herbst, see Fig. 1, or King, see Figs. 1-4 where the threads are on an extended portion separate from the electrodes). The change in configuration of the threads, whether directly or indirectly contacting the electrodes, is obvious absent persuasive evidence that the particular configuration is significant. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Response to Arguments

11. Applicant's arguments filed 6/16/2010 have been fully considered but they are not persuasive. Applicant argues that Herbst suggests an electrocoagulation process which is different from electroflotation. The examiner respectfully disagrees. Herbst teaches the use of gas to separate waste (c8/L26-33 thus electroflotation is present and included).

Applicant further argues that Herbst fails to suggest a separation tower of a flock and purified water. The examiner respectfully disagrees. As previously disclosed in the Office Action dated 3/16/2010, Herbst discloses feeding the mass flow from the cell to the separation tower of a flock and purified water (see Fig. 1 and c7/L34-50).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., reactions taking place inside the solution) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant further argues that Herbst suggests that the center rod and the outer one tube serve as a cathode thus indicating that Herbst fails to show that the less electronegative electrode should serve as the anode. The applicant misunderstood the rejection in question. Herbst discloses multiple embodiments where the electrodes inner can be cathodes or anodes (c9/L1-20). The examiner would like to emphasize that the rejection was based on the embodiment where the center electrode is the anode.

Applicant further argues that Haivala fails to suggest that the turbulences are created intermittently for cleaning purposes. As disclosed in the previous Office Action, Herbst discloses periodically cleaning the electrode but does not disclose the use of flush water to clean. Herbst was relied upon to show the periodic cleaning while Haivala teaches using the jet streams to clean the surfaces (c2/L25-32) and that the flow is controlled (c5/L8-20). In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant further argues that the combination of Herbst and Haivala would provide a constant circulation of wastewater and that the injection of the medium into the flock destroys the ability to raise the flock. The examiner respectfully disagrees. Haivala teaches that the flow is controlled (c5/L8-20). One of ordinary skill would know that controlling the flow controls the pressure thus controlling the mixing and flushing of the surface (Haivala c4/L1-11). Furthermore, the cleaning is periodic (Herbst, c7/L46-

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50). Thus, the combination of the two references would not provide a constant circulation of wastewater.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SUSAN THAI whose telephone number is (571)270-1487. The examiner can normally be reached on Monday-Thursday, 6:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam X. Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

/SUSAN THAI/
Examiner, Art Unit 1795